

January 2009

Type Y696 Vapor Recovery Regulator



W5996

Figure 1. Type Y696 Vapor Recovery Regulator

Introduction

Scope of Manual

This instruction manual includes installation, startup, maintenance, and parts information for the Type Y696 vapor recovery regulator.

Product Description

The Type Y696 vapor recovery regulator is a direct-operated regulator with internal registration requiring no downstream control line. It is used to sense increase in vessel pressure and vent excessive internal vessel pressure to an appropriate vapor recovery disposal or reclamations system.

Specifications

The Specifications section lists maximum pressures, temperatures, and other specifications. Specifications for a given regulator as it originally comes from the factory are stamped on the spring case nameplate.

Principle of Operation

The Type Y696 is used to maintain a constant inlet (blanket) pressure with the outlet flowing to a system whose pressure is lower than that at the inlet.

When vessel pressure increases above the setpoint of the regulator due to pumping in or thermal heating, the force of the control spring is overcome by



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Specifications

Body Size and End Connection Style⁽¹⁾

See Table 1

Maximum Allowable Inlet and Outlet Pressure⁽²⁾

15 psig (1,0 bar)

Control Pressure Ranges

See Table 2

Pressure Registration

Internal

Spring Case and Vent Connections

1/4-inch NPT

Maximum Temperature Capabilities⁽²⁾

Nitrile (NBR): -20° to 180°F (-29° to 82°C)

Fluorocarbon (FKM): 0° to 300°F (-18° to 149°C)

1. The pressure/temperature limits in this instruction manual or any applicable standard limitation should not be exceeded.

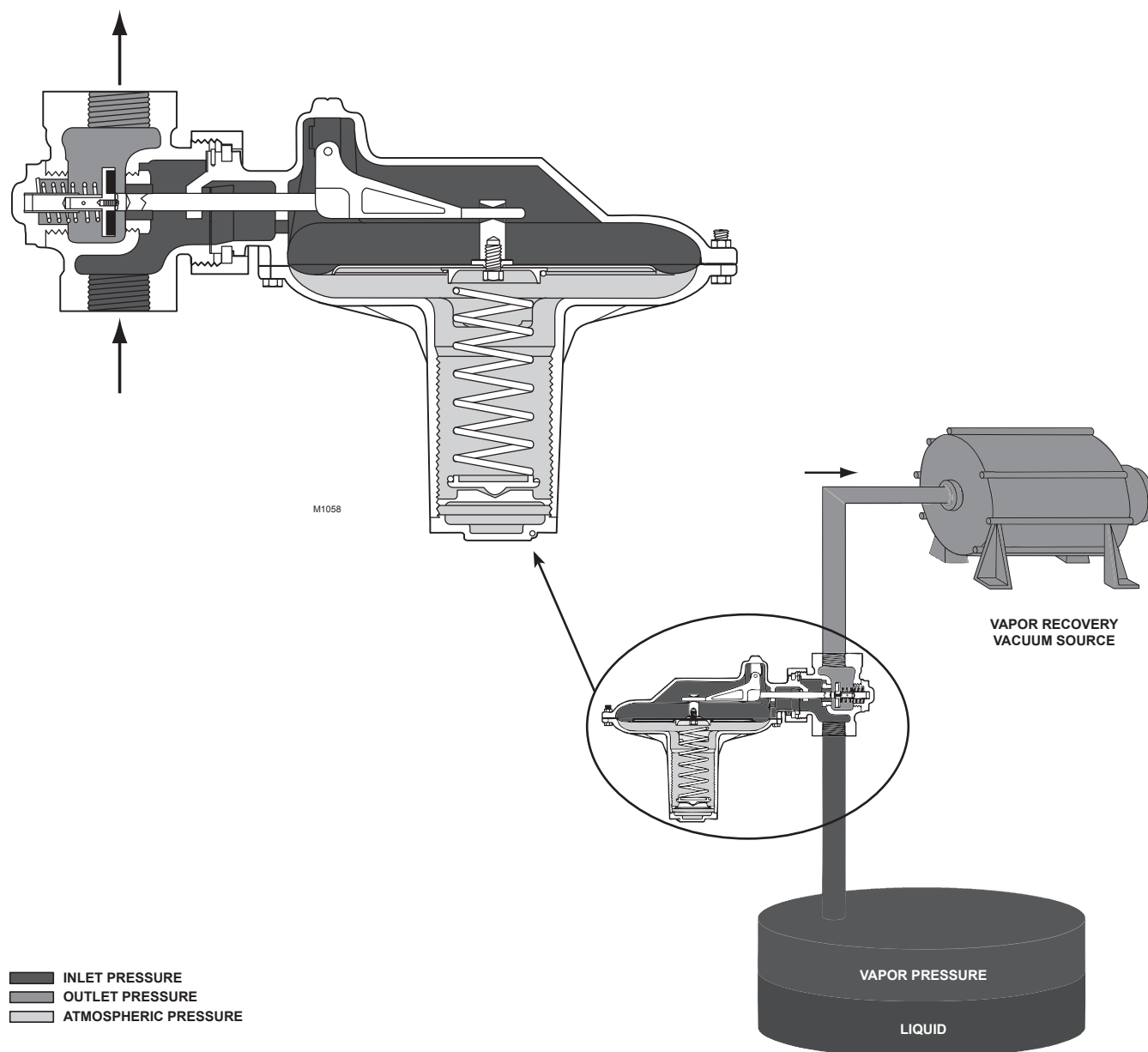


Figure 2. Type Y696 Vapor Recovery Operational Schematic

Table 1. Body Sizes and End Connection Styles

BODY SIZE, INCHES (DN)	BODY MATERIAL			
	Cast Iron	Steel	Stainless Steel	Hastelloy® C
1-1/2 and 2 (40 and 50)	NPT	NPT, SWE, CL150 RF, CL300, PN 16/25/40	NPT, SWE, CL150 RF, CL300, PN 16/25/40	CL150 RF

Table 2. Control Pressure Ranges

CONTROL PRESSURE RANGE	SPRING PART NUMBER	SPRING COLOR	WIRE DIAMETER
2 to 5-inches w.c. (5 to 12 mbar) ⁽¹⁾⁽²⁾	1A200127022	Red	0.135-inches (3,43 mm)
5 to 15-inches w.c. (12 to 37 mbar) ⁽¹⁾⁽²⁾	1B577727062	Gray	0.156-inches (3,96 mm)
0.3 to 1 psig (0,02 to 0,07 bar)	0B019427052	Green	0.187-inches (4,75 mm)
1 to 2.8 psig (0,07 to 0,19 bar)	0A081127202	Orange	0.250-inches (6,35 mm)
2 to 3.5 psig (0,14 to 0,24 bar)	0Y066427022	Green stripe	0.363-inches (9,22 mm)
4 to 7 psig (0,28 to 0,48 bar)	1H8024000A2	Silver	0.406-inches (10,3 mm)

1. Spring ranges based on spring case installed pointed down. When installed pointed up, spring range increases 2-inches w.c. (5 mbar).
2. Do not use Fluorocarbon (FKM) diaphragm with these springs at diaphragm temperatures lower than 60°F (16°C).

pressure acting on the diaphragm. This moves the disk away from the orifice allowing gas to flow from the vessel to the vapor recovery system.

As vessel pressure is reduced, the force of the control spring causes the disk to move toward the orifice decreasing the flow of gas out of the vessel. As vessel pressure drops below the setpoint of the regulator, the disk will seat against the orifice shutting off the flow of gas.

Installation



WARNING

Personal injury, equipment damage, or leakage due to escaping accumulated gas or bursting of pressure-containing parts may result if the vapor recovery regulator is overpressured or installed where service conditions could exceed the limits given in the Specifications section, or where conditions exceed any ratings of the adjacent piping or piping connections. To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices to prevent service conditions from exceeding those limits.

Additionally, physical damage to the vapor recovery regulator could result in personal injury and property damage due to escaping accumulated gas. To avoid such injury and damage, install the vapor recovery regulator in a safe and well ventilated location.

1. Use qualified personnel when installing, operating, and maintaining the regulator. Before installing, inspect the regulator for any shipment damage or foreign material that may have collected during crating and shipment. Make certain the body interior is clean and the pipelines are free of foreign material. Apply pipe compound only to the male pipe threads.
2. Install the regulator using a straight run of pipe the same size or larger as the regulator body (as shown in Figure 2). Flow through the regulator body is indicated by the flow arrow cast on the body. If a block valve is required, install a full flow valve between the regulator and the blanketed vessel. For proper operation, the regulator should be installed with the spring case barrel pointed down. Key numbers referenced in this section are shown in Figure 3.



WARNING

A regulator may vent some gas to the atmosphere. In hazardous or flammable gas service, vented gas may accumulate, and cause personal injury, death, or property damage due to fire or explosion. Vent a regulator in hazardous gas service to a remote, safe location away from air intakes or any hazardous location. The vent line or stack opening must be protected against condensation or clogging.

3. To keep the spring case vent from being plugged or the spring case from collecting moisture, corrosive chemicals, or other foreign material, point the vent down or otherwise protect it.

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4. To remotely vent the regulator, remove the vent (key 56) and install obstruction-free tubing or piping into the 1/4-inch NPT vent tapping. Provide protection on a remote vent by installing a screened vent cap into the remote end of the vent pipe.
5. If continuous operation of the system is required during inspection or maintenance, install a three-valve bypass around the regulator.
6. Vapor recovery regulators are used to maintain a constant inlet (blanket) pressure with the outlet flowing to a system whose pressure is lower than that at the inlet. The vapor recovery regulators are not intended to be used as an ASME certified relief device for overpressure protection. They are to be used as part of a gas blanketing system to control the outflow of blanketing gas under normal conditions and to collect tank vapors for the vapor disposal or reclamation system. You should provide alternate methods of emergency overpressure protection.

Startup and Adjustment



WARNING

To avoid personal injury, property damage, or equipment damage caused by bursting of pressure containing parts or explosion of accumulated gas, never adjust the control spring to produce an outlet pressure higher than the upper limit of the outlet pressure range of that particular spring. If the desired outlet pressure is not within the range of the control spring, install a spring of the proper range according to the Diaphragm and Spring Case Area section of the maintenance procedure.

With installation completed, the regulator can be placed in operation by slowly opening the upstream and downstream block valves, if used, while using gauges to monitor pressure.

The regulator has been adjusted at the factory to provide approximately the pressure requested. The range of allowable pressure settings is stamped on the spring casing nameplate. If a pressure setting beyond the stamped range is required, install a spring with the desired range by following the procedures for changing

the spring and diaphragm in the Maintenance section. To adjust the pressure setting, perform the following steps (key numbers are referenced in Figure 3):

1. Remove the closing cap (key 3).
2. Turn the adjusting screw (key 2) either clockwise to increase control pressure or counterclockwise to decrease control pressure. The regulator will go into immediate operation. To ensure correct operation always use a pressure gauge to monitor the vapor recovery pressure when making adjustments.
3. Replace the closing cap (key 3).

Shutdown

First close the nearest upstream shutoff valve and then close the nearest downstream shutoff valve to vent the equipment properly. Next, open the vent valves on both the upstream and downstream sides of the regulator. All pressure between the shutoff valves is released through the open vent valves.

Maintenance

Regulator parts are subject to normal wear and must be inspected and replaced as necessary. The frequency of inspection and replacement of parts depends upon the severity of service conditions or the requirements of local, state, and federal regulations. Due to the care Fisher® takes in meeting all manufacturing requirements (heat treating, dimensional tolerances, etc.), use only replacement parts manufactured or furnished by Fisher.

Key numbers are referenced in Figure 3.



WARNING

To avoid personal injury, property damage, or equipment damage caused by sudden release of pressure, isolate the regulator from all pressure and cautiously release trapped pressure from the regulator before attempting disassembly.

Body Area

This procedure is for gaining access to the disk assembly, orifice, body gasket, and split ring. All pressure must be released from the regulator, before the following steps can be performed.

1. To inspect and replace the disk assembly (key 25) or orifice (key 27), remove the body cap assembly (key 38).
2. Remove the disk screw (key 47) and cotter pin (key 14) from the disk shutoff stem (key 40) if it is necessary to replace the disk assembly (key 25).
3. To inspect and replace the orifice (key 27), loosen the union nut (key 19) and separate the diaphragm case assembly from the body (key 28).
4. Remove and inspect the body gasket (key 16).
5. Inspect and replace the orifice (key 27) if necessary. Lubricate the threads of the replacement orifice with a good grade of pipe thread sealant. Install and tighten using 75 to 100 foot-pounds (102 to 136 N•m) of torque.
6. If necessary, install the replacement body gasket (key 16) into the body (key 28).
7. Slide the union nut (key 19) as far as it will go onto the lower casing assembly (key 20). Install both halves of the split ring (key 17) into the slots of the lower casing assembly (key 20) and secure them by sliding the union nut down on the split ring.

Note

In the following step, be sure to install the spring case barrel pointed down as shown in Figure 1.

8. Install the lower casing assembly (key 20) by tightening the union nut (key 19) until the lower casing assembly is secure on the body (key 28).
9. Install the disk spring (key 41) and disk assembly (key 25) and secure it to the disk stem (key 40) with the cotter pin (key 14). Install the disk screw (key 47).
10. Use a good quality thread sealer when replacing the body cap assembly (key 38).

Diaphragm and Spring Case Area

This procedure is for gaining access to the control spring, diaphragm, and lever assembly stem. All pressure must be released from the diaphragm case assembly before the following steps can be performed.

To Change the Control Spring:

1. Remove the closing cap (key 3), and turn the adjusting screw (key 2) counterclockwise until all compression is removed from the control spring (key 1).
2. Remove the adjusting screw (key 2) and the upper spring seat (key 44) and change the control spring to match the desired spring range.
3. Replace the upper spring seat (key 44) and the adjusting screw (key 2).
4. Install a replacement closing cap gasket (key 35), if necessary, and reinstall the closing cap (key 2).
5. If the spring range was changed, be sure to change the stamped spring range on the spring case nameplate.

To Maintain Diaphragm Parts:

1. Remove the closing cap (key 3), and the adjusting screw (key 2).
2. Remove the hex nuts (key 22), cap screws (key 21) and spring case (key 23).
3. Lift the upper spring seat (key 44), and control spring (key 1) off the diaphragm and plate assembly (key 5).
4. Remove the diaphragm and plate assembly (key 5) by tilting them so that the pusher post (key 8) slips off the lever assembly (key 9).
5. To separate the diaphragm assembly (key 5) from the attached parts, unscrew the cap screw (key 30) from the pusher post (key 8).
6. To replace the lever assembly (key 9), remove the machine screws (key 11). To replace the stem (key 13) pull the stem (key 13) out of the lower casing assembly (key 20).
7. Install the stem (key 13) into the lower casing assembly (key 20).
8. Install the lever assembly (key 9) into the stem (key 13) and secure the lever assembly (key 9) with the machine screws (key 11).
9. During the assembly procedure, use lubricants on parts as indicated in Figure 3 and replace parts as required.

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10. Install the parts on the pusher post in the order listed below:
 - Diaphragm plate gasket (key 7)
 - Lower diaphragm plate (key 6)
 - Diaphragm and plate assembly (key 5) pattern side up
 - Control spring seat (key 4)
11. Insert and tighten the diaphragm cap screw (key 30) to secure the diaphragm parts to the pusher post (key 8).
12. Install the assembled parts in the lower casing (key 20). Make sure that the lever (key 9) fits in the pusher post (key 8) and that the holes in the diaphragm align with the holes in the lower casing.
13. Install the spring case (key 23) on the lower casing assembly (key 20) so that the vent assembly (key 56) is correctly oriented, and secure with the cap screws (key 21) and hex nuts (key 22) fingertight only.
14. Place the spring (key 1) in the spring case assembly (key 23), then install the upper spring seat (key 44) and the adjusting screw (key 2).
15. Turn the adjusting screw (key 2) clockwise until there is enough control spring (key 1) force to provide proper slack to the diaphragm (key 5). Using a crisscross pattern, finish tightening the cap screws (key 21) and hex nuts (key 22) to 15 to 20 foot-pounds (20 to 27 N•m) of torque. To adjust the outlet pressure to the desired setting, refer to the Startup and Adjustment section.
16. Install a replacement closing cap gasket (key 35) if necessary, and then install the closing cap (key 3).

Parts Ordering

When contacting your local Sales Office about this regulator, include the type number and all other pertinent information stamped on the nameplate. Specify the complete 11-character part number from the following parts list when ordering replacement parts.

Parts List

In this parts list, parts marked NACE are intended for corrosion-resistant service as detailed in the NACE International Standards MR0175 and MR0103.

Type Y696 Regulator (Figure 3)

Key	Description	Part Number
1	Control Spring, Plated steel	See Table 2
2	Adjusting Screw, Zinc	1A5896X0022
3	Closing Cap Zinc Steel	1A589544022 1J880124092
4	Lower Control Spring Seat, Zinc	0X014744012
5*	Diaphragm Nitrile (NBR) Fluorocarbon (FKM)	0R032502072 0R0325X0032
6	Lower Diaphragm Plate Stainless steel Stainless steel (NACE)	0V003935032 0V0039X0022
7	Diaphragm Plate Gasket, Composition	1A348704022
8	Pusher Post, Stainless steel (NACE)	0Y096435072
9	Lever Assembly Stainless steel Stainless steel (NACE)	1E3409000B2 1E3409X0012
11	Machine Screw (2 required) Stainless steel Stainless steel (NACE)	1A866935032 1A8669X0012
13	Stem Stainless steel Stainless steel (NACE)	1A630935032 1A630935032
14*	Cotter Pin Stainless steel Stainless steel (NACE)	1A866537022 1A8665X00A2
16*	Body Gasket, Composition	1A348004032
17	Split Ring, Zinc-plated steel	0Y095828982
19	Union Nut Cast iron Steel Stainless steel	0Z0176X0032 0Z017624092 0Z0176X0012
20	Lower Casing Cast iron Steel Stainless steel	3B973519012 3F191622012 3F191633092
21	Diaphragm Case Cap Screw, Plated steel (12 required)	1B596124052
22	Hex Nut, Zinc-plated steel (12 required)	1A309324122
23	Spring Case Cast iron Steel Stainless steel	2B155719042 34B2157X012 34B2157X022
24	Diaphragm Plate Up to 1.25 psig (0.09 bar) setpoint Over 1.25 psig (0.09 bar) setpoint	0B006628982 1A347825022

*Recommended spare part.

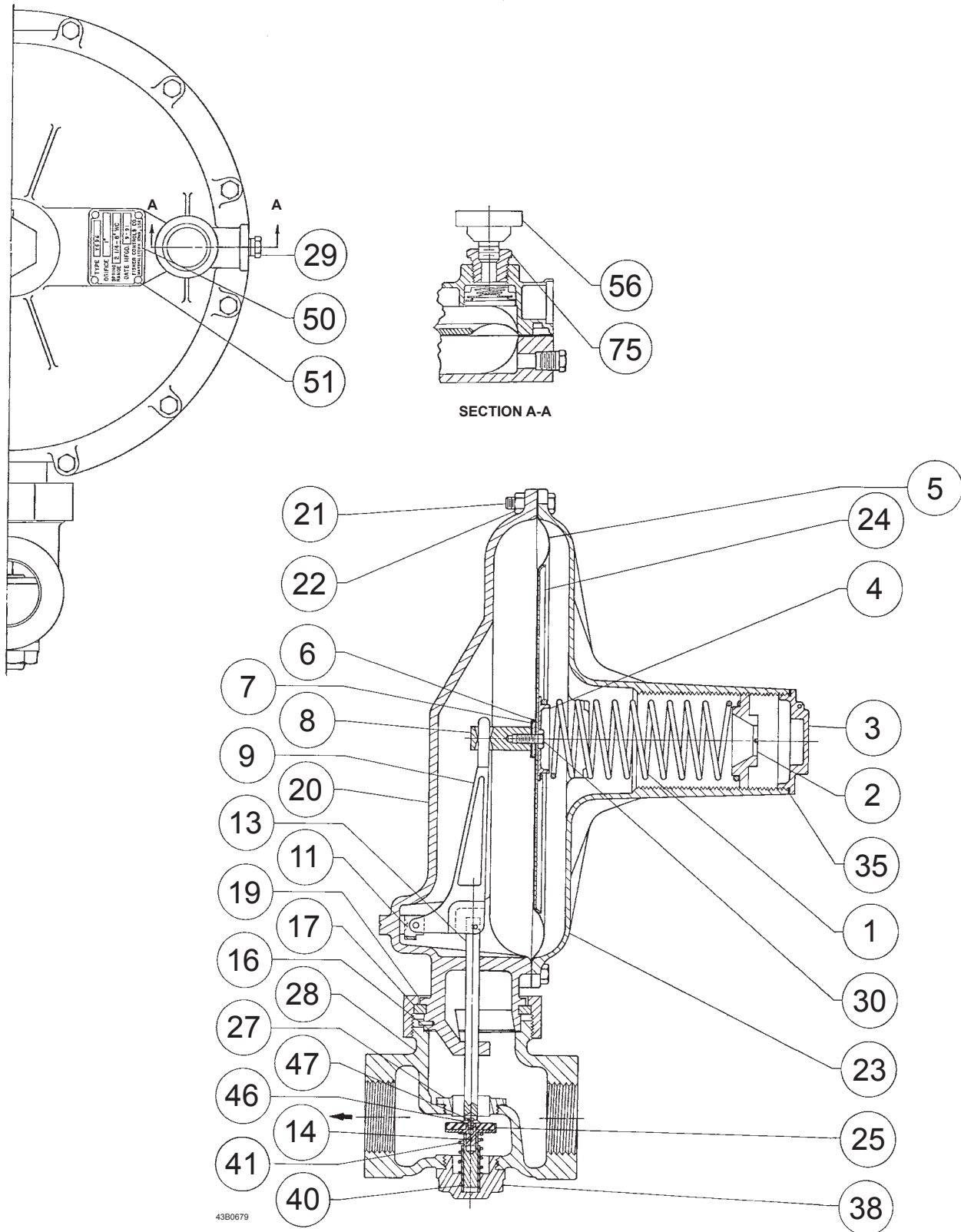


Figure 3. Type Y696 Assembly

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Key	Description	Part Number	Key	Description	Part Number
25*	Disk Assembly		29	Pipe Plug, Zinc-plated steel	1C333528992
	Stainless Steel Disk Holder with		30	Diaphragm Cap Screw, Plated steel	1C473224052
	Nitrile (NBR) disk	1D6405X0202	35*	Closing Cap Gasket, Neoprene (CR)	1N446206992
	Nitrile (NBR) disk (NACE)	1D6405X0202	38	Body Cap Assembly	
	Fluorocarbon (FKM) disk (NACE)	1D6405X0212		Stainless steel	15A2185X022
27	Orifice			Stainless steel (NACE)	15A2185X012
	Stainless steel	0L025335032	40	Disk Shutoff Stem	
	Stainless steel (NACE)	0L0253X0042		Stainless steel	0L025135032
28	Body			Stainless steel (NACE)	0L0251X0022
	NPT		41	Disk Spring	
	Cast iron			Stainless steel	
	1-1/2-inch size	1B403419012		Up to 1.25 psig (0,09 bar) setpoint	1A866837022
	2-inch size	1B403519012		Over 1.25 psig (0,09 bar) setpoint	0D002827022
	Steel			Stainless steel (NACE)	
	1-1/2-inch size	2P2573X0022		Up to 1.25 Psig (0,09 bar) setpoint	10B6026X012
	1-1/2-inch size (NACE)	2P2573X0032		Over 1.25 Psig (0,09 bar) setpoint	10B6027X012
	Stainless steel		44	Upper Spring Seat	0Y095644012
	1-1/2-inch size	2P2573X0012	46	Valve Disk Washer	
	CL150 RF flanged			Stainless steel	0X014635032
	Steel			Stainless steel (NACE)	0X0146X0012
	1-1/2-inch (DN 40) size (NACE)	22B4316X022	47	Disk screw, Stainless steel (NACE)	1A866435042
	2-inch (DN 50) size	22B9226X022	50	Nameplate	-----
	Stainless steel		51	Drive Screws (4 required)	-----
	1-1/2-inch size (DN 40) (NACE)	22B4316X012	75	Bushing, Steel	1A3424X00A2
	2-inch (DN 50) size	22B9226X012	78	Pipe Plug, Steel	1D754828982

*Recommended spare part.

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